U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September 2024 Supplementary Examinations

Programme: B.E. **Semester: I/II**
Branch: Civil Engineering Stream **Duration: 3 hrs.**
Course Code: 22CY2BSCCV **Max Marks: 100**
Course: Applied Chemistry for Civil Engineering Stream

Instructions:1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	With the help of a neat sketch explain the construction and working of calomel electrode and list out its applications.	CO1	PO1	**07**
	b)	Define corrosion. Explain the electrochemical theory of corrosion taking iron as an example with necessary reactions.	CO1	PO1	**07**
	c)	A cell is obtained by combining two nickel electrodes immersed in nickel sulfate solutions of 0.15 M and 0.6 M at 298 K. Represent the cell, write cell reactions and calculate the EMF of the cell.	CO2	PO2	**06**
		OR			
2	a)	Explain the construction and working of glass electrode. Mention any one limitation of it.	CO1	PO1	**07**
	b)	Define corrosion penetration rate (CPR). A steel plate having the area of 95 inch^2 was exposed to moist air in a sugar industry. After a period of one year, it was found that material has lost 473 g due to corrosion. Calculate the CPR in mpy and mmpy. Given: density of the steel is 7.9 g/cm^3 and K= 534.	CO2	PO2	**07**
	c)	Define metal finishing. List out any five technological importance of metal finishing.	CO3	PO7	**06**
		UNIT – II			
3	a)	Define gross calorific value of fuel. With the help of a neat sketch explain the determination of calorific values of solid fuel using bomb calorimeter.	CO1	PO1	**07**
	b)	Outline the construction and working of the rechargeable $LiCoO_2$ battery with neat diagram.	CO1	PO1	**07**
	c)	Describe the construction and working of Si based solar cell. Mention its disadvantages.	CO3	PO7	**06**
		UNIT – III			
4	a)	What are polymer composites? Explain the synthesis, properties and applications of Kevlar fiber.	CO1	PO1	**07**

		b)	In a polymer sample, 25 molecules have molecular mass 17500 g/mol, 45 molecules have molecular mass 21000 g/mol and remaining 30 molecules have molecular mass 25000 g/mol. Calculate number- average, weight average molecular masses of the polymer and PDI. Comment on PDI.	CO2	PO2	**07**
		c)	Explain the synthesis and applications of urea-formaldehyde resin.	CO1	PO1	**06**
			OR			
	5	a)	Define glass transition temperature (Tg) of polymer. Discuss how the following factors affect Tg : i) flexibility of the polymer chain ii) branching and cross linking.	CO2	PO2	**07**
		b)	What are biodegradable polymers? Explain the synthesis and mechanism of degradation of polyglycolic acid.	CO3	PO7	**07**
		c)	Outline the synthesis and applications of epoxy resin.	CO1	PO1	**06**
			UNIT –IV			
	6	a)	What is an alloy? Write any three properties and applications of cast iron.	CO1	PO1	**07**
		b)	What are refractory materials? Explain the classification of refractory materials based on chemical composition.	CO1	PO1	**07**
		c)	Describe the manufacturing of cement by wet chemical method.	CO1	PO1	**06**
			UNIT –V			
	7	a)	What are conductometric sensors? Explain the estimation of acid mixture through conductometric method.	CO1	PO1	**07**
		b)	Define COD of wastewater. 25 cm^3 of wastewater sample was mixed with 20 cm^3 of acidified $K_2Cr_2O_7$. The unreacted $K_2Cr_2O_7$ required 8.6 cm^3 of 0.1 N FAS. In a blank titration 20 cm^3 of acidified $K_2Cr_2O_7$ required 17 cm^3 of same FAS. Calculate the COD of the wastewater sample.	CO2	PO2	**07**
		c)	What are nanomaterials? Describe any two important size dependent properties of nanomaterials.	CO1	PO1	**06**

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